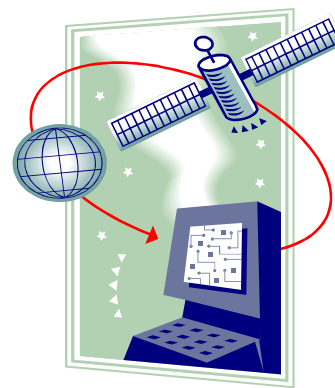# Workforce Assessment of Information Technology Sailors

Federico Garcia
James Gasch
Mitzi Wertheim

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Overview

□ **Method**

□ **Application to**

- **Reenlistment bonuses**

- **Advancement exams**

- **Training**

➢**Benefits/costs of enhancing training**

Key Definitions

☐ **<u>Skill Groups</u>: Families of tasks and associated knowledge, skills, abilities, and tools (KSATs).* Developed by SkillsNET**

☐ **<u>Knowledge</u>: Information that workers need to know (or know where to find) to perform their tasks**

☐ **<u>Skills</u>: Work capabilities obtained from training or experience**

☐ **<u>Abilities</u>: Work capabilities not obtained from training or experience; personal traits**

☐ **<u>Tools</u>: Resources needed to perform the tasks**

☐ **<u>Occupational Standards</u>: Navy work tasks performed by enlisted personnel. Basis for personnel planning, procurement, training, promotion, assignment, and mobilization.**

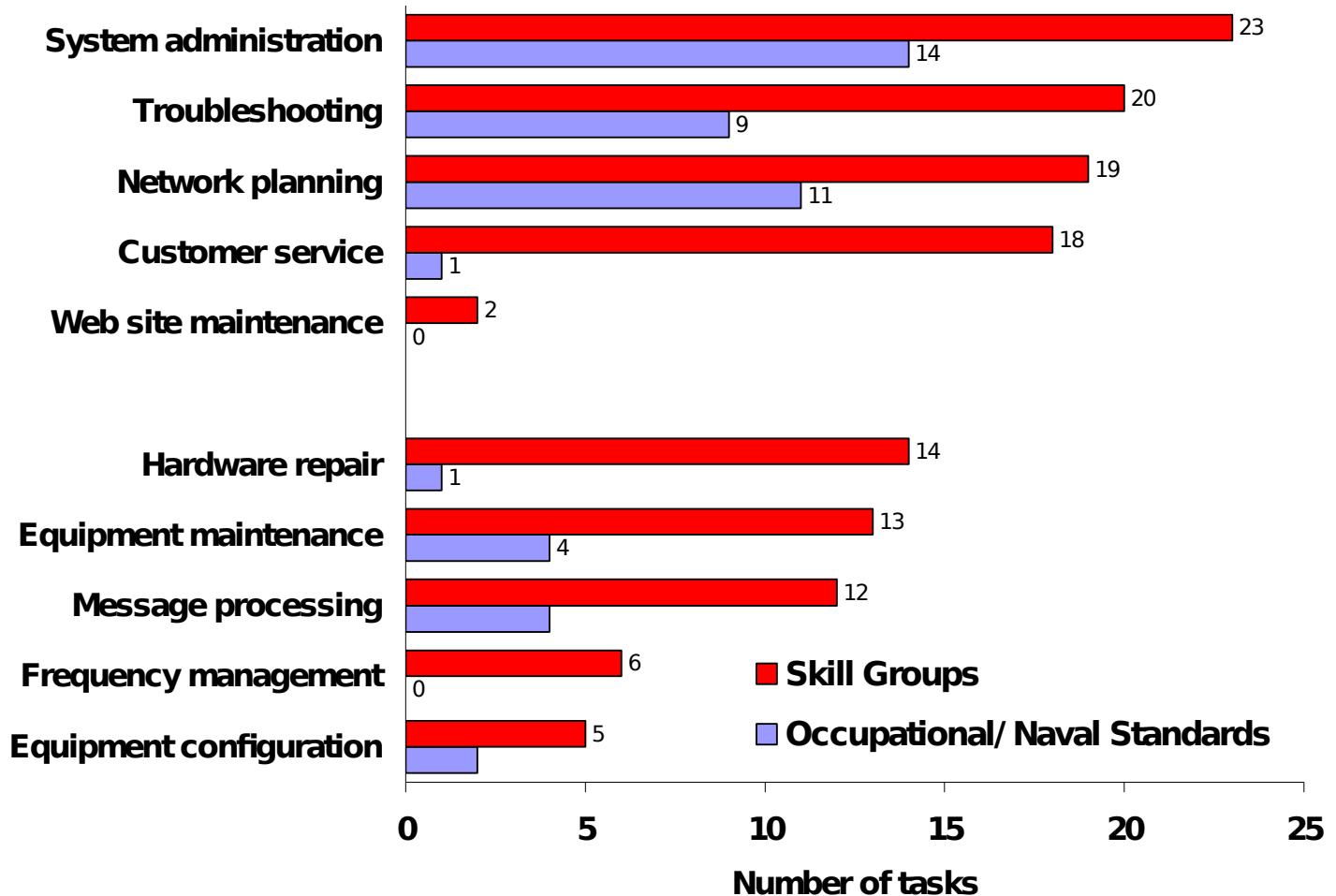* Skill Groups are SkillObjects, a SkillsNET trademark

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Skill Groups Are More Comprehensive than Occupational/Naval Standards

	Year created	Tasks	K	S	A	T	
Occ. Standards	1976	X					Tasks seldom described in context and rating-dependent
Naval Standards	1976	X					Tasks for administrative/ military functions
Navy Enlisted Classification (NEC)	1945						No occupational task statements currently recorded
Skill Groups	1996	X	X	X	X	X	Tasks described in context and independent of ratings

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Skill Groups Capture More Tasks Than the Occupational/Naval Standards

CNA

Info. Systems Administration

System administration — 23 / 14

Troubleshooting — 20 / 9

Network planning — 19 / 11

Customer service — 18 / 1

Web site maintenance — 2 / 0

Communications

Hardware repair — 14 / 1

Equipment maintenance — 13 / 4

Message processing — 12

Frequency management — 6 / 0

Equipment configuration — 5

■ **Skill Groups**

□ **Occupational/Naval Standards**

Number of tasks (0, 5, 10, 15, 20, 25)

- Skill Groups identify 200 more tasks than the Occupational/Naval Standards

- 15 tasks in Occupational Standards not in Skill Groups—mostly obsolete

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Missed Tasks
Info. Systems Admin. sample

Skill Groups

Obsolete

❑ Correct printer ribbon and paper movement problems

❑ Reset tape drives or tape controllers

❑ Perform system dumps

Occupational Standards

Critical

❑ Clean workstations/media infected with viruses

❑ Teach other computer/technical personnel about hardware or software operation and procedures

❑ Assist customers with problems (such as LAN connectivity, desktop, or account problems)

❑ Enable tunnels (such as encapsulation of IP packet headers)

Data and Metrics

SkillsNET process

- ❑ **Sailors at five fleet concentration areas describe their work**
- ❑ **Other Sailors reviewed tasks and linked KSATs**
- ❑ **Survey to rate mission criticality of tasks**
  - – **Consequences of misperformance**
  - – **Delay tolerance**
  - – **Proportion of workforce performing task**
  - – **Time on task**

Additional data

- ❑ **Curriculum developers and exam writers identified tasks they cover**
- ❑ **Other**
  - – **Survey of current training**
  - – **Schoolhouse course costs**
  - – **Enlisted Master File**

Skill Groups Link to the Occupational Information Network (O*NET)

What is O*NET?

- **DoL database of 1,200 civilian jobs—and growing**

- **480 variables of job requirements, worker attributes, and work environment**

- **Common language**

- **50 years of occupational research**

- **Potential for linking to jobs in other services**

Similar Jobs in O*NET

Civilian jobs	Median annual salary	Education required	Projected growth in employment (percent)
Systems analysts		Bachelor's	94
Database administrators		Bachelor's	77
Computer programmers		Bachelor's	30
Other computer scientists		Bachelor's	118
Computer support specialists		Associate's	102
Phone & cable line installers and repairers		Long-term on-the-job training	30
Data process. equipment repairers		Vocational training	47

America's Career InfoNet, 1998 figures; employment growth for next 10 years.

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Overview

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🔲 **Application to**

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    – **Advancement exams**

    – **Training**

      ➤**Benefits/costs of enhancing training**

Bonus Field and Actual Work Often Don't Match
Bonus for C-School graduates (NEC 2735)

Bonus recipients
C-School
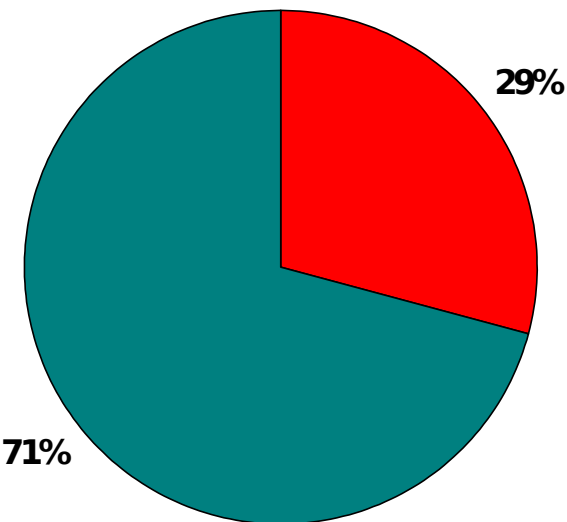
No bonus
No C-School
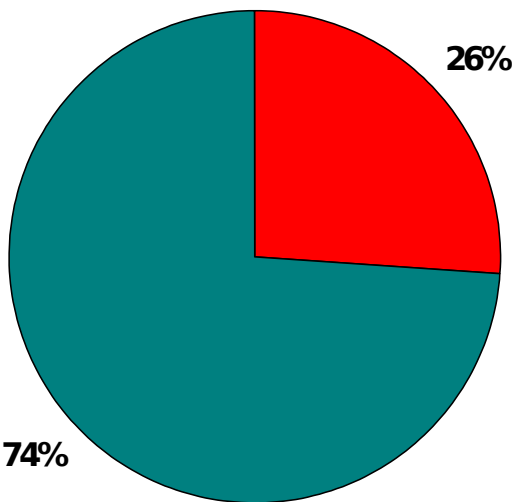
Do not do LAN/
Sys. Admin.
tasks

Do LAN/Sys.
Admin. tasks

29%

71%

26%

74%

Cost ($M FY01)

+
$2.6   Out-of-field bonus
$2.9   Training not used
$5.5   TOTAL

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☐ **Method**
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    ➢ **Benefits/costs of enhancing training**
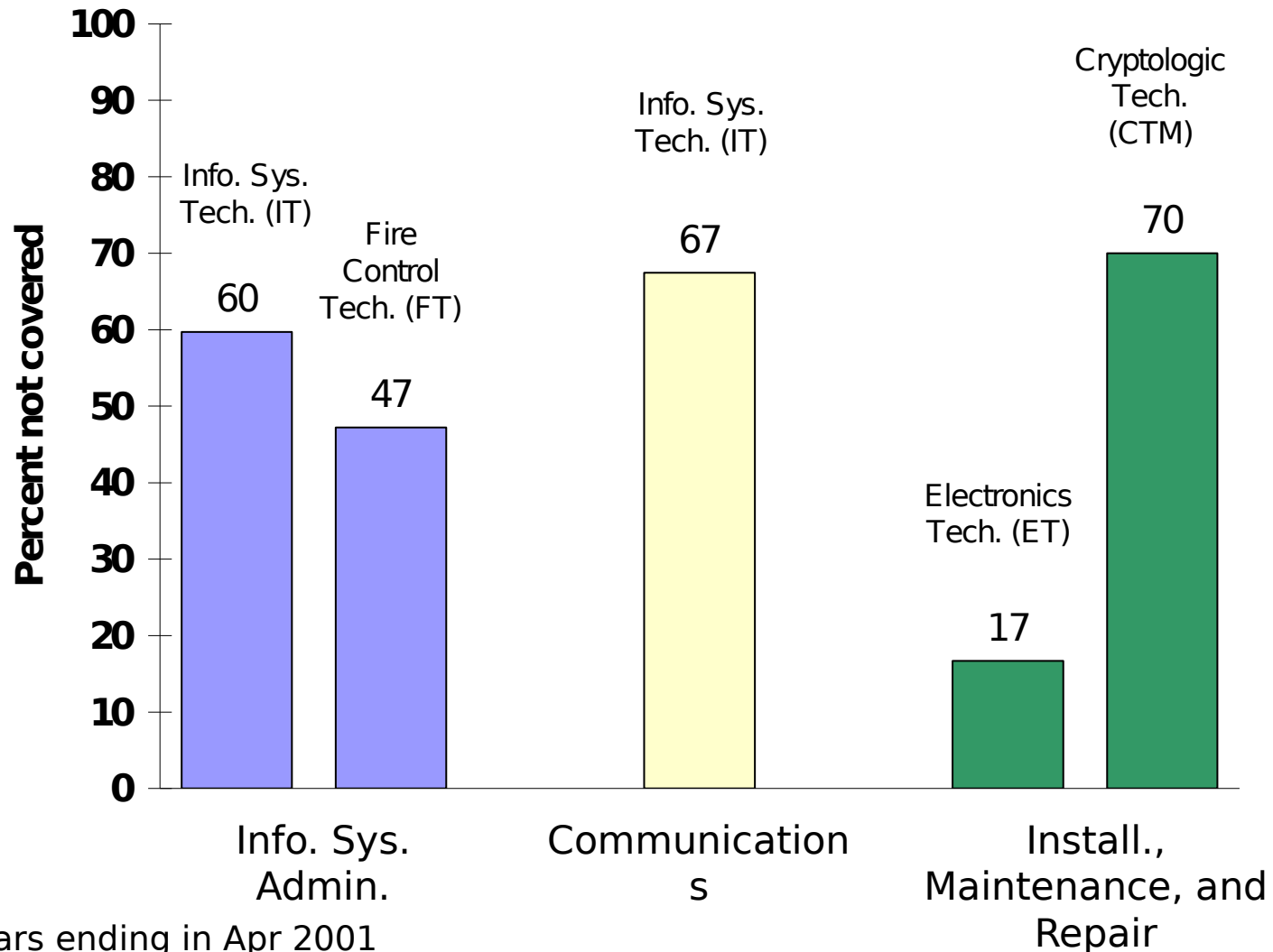
Overview

□ **Method**
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- – **Training**
  - ➢**Benefits/costs of enhancing training**

Potential for Training Consolidation
Overlap of tasks

Info. Systems
Administration
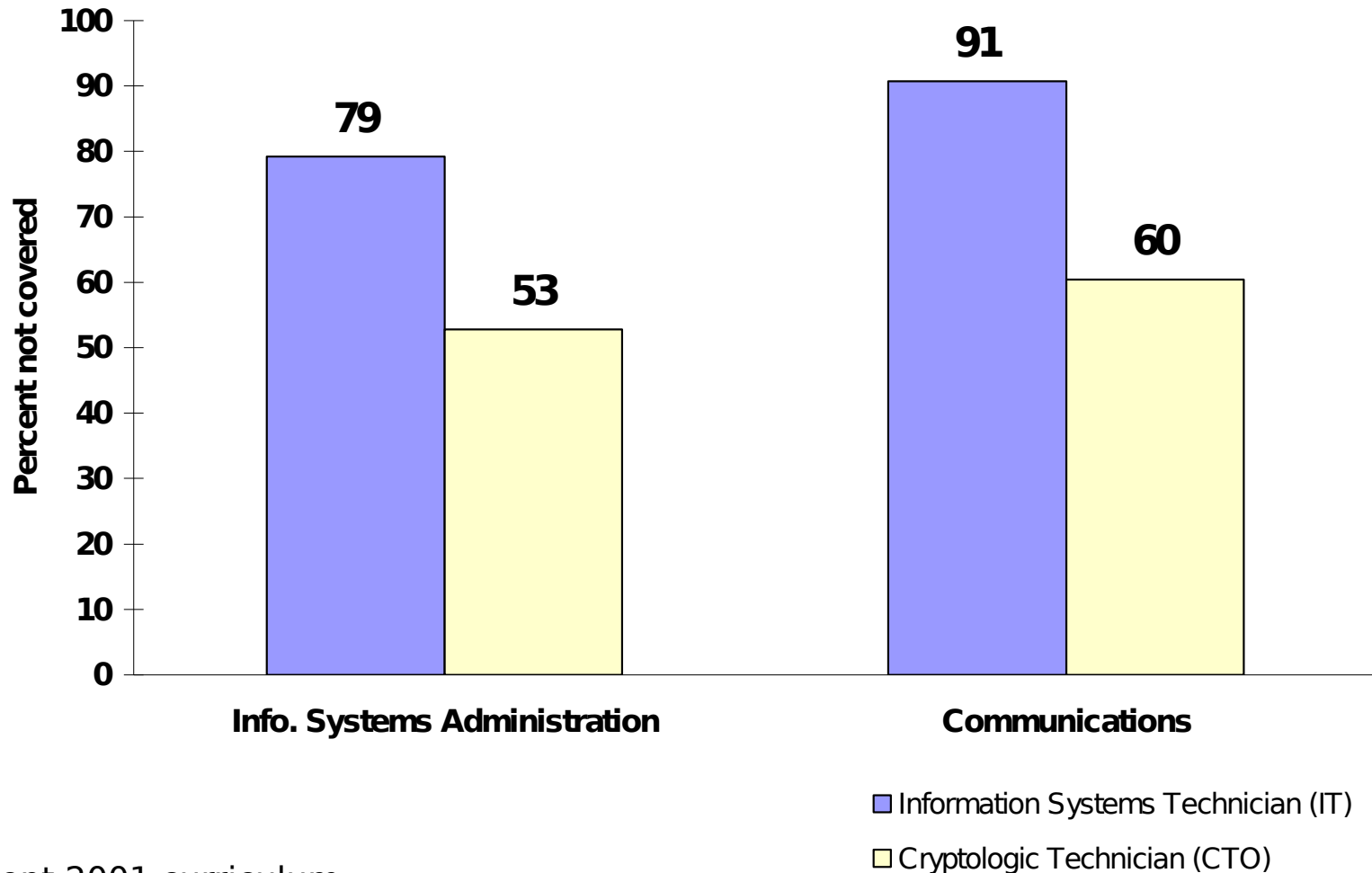
Communications
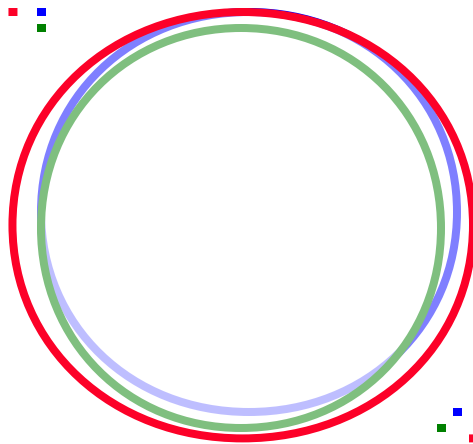
Info. Sys. Tech. (IT)

Crypto. Tech. (CTO-CTM)

Fire Control Tech. (FT)
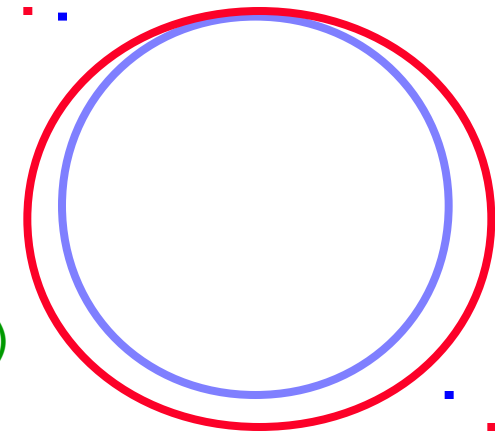
Not to scale

Percent of IT tasks that overlap with	Info. Sys. Admin.	Comm.
CTO-CTM	85%	70%
FT	85%	
Both CTO-CTM & FT	73%	

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A-Schools Do Not Cover Many Critical Tasks

Sept 2001 curriculum
Technical tasks only

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Most Useful Training
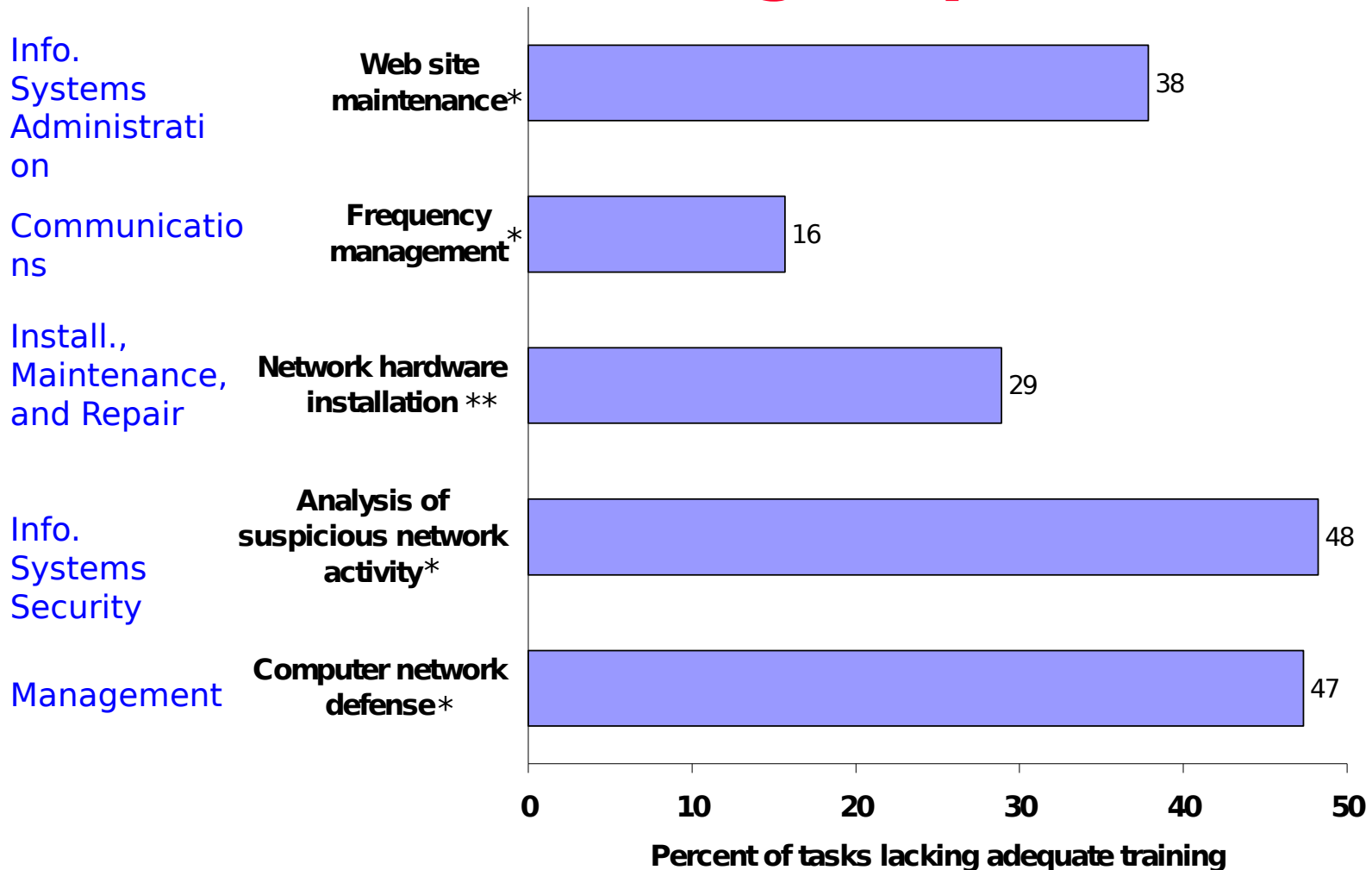## Reported by IT workforce

E4 and below only

17
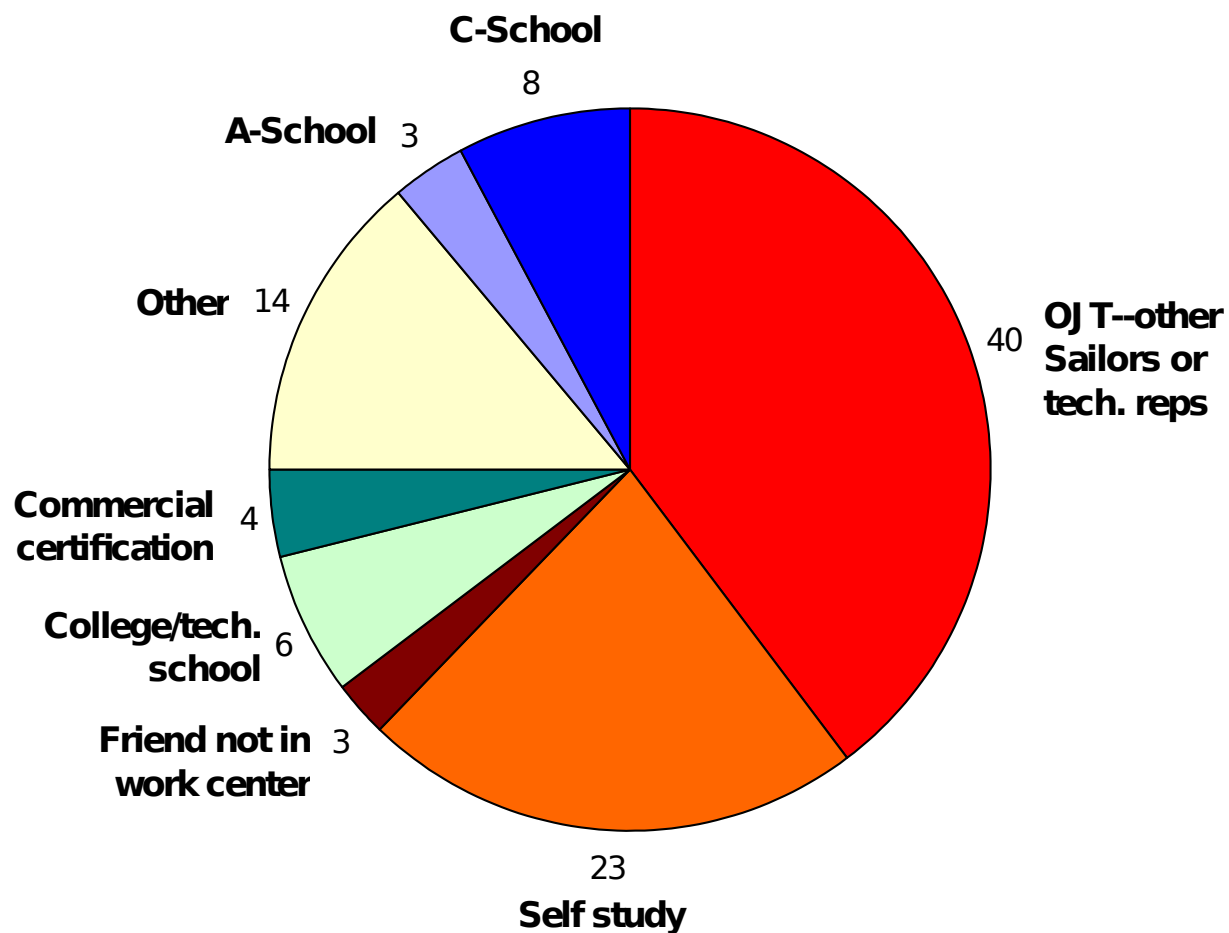
Sailors Lack Adequate Training for Critical Tasks
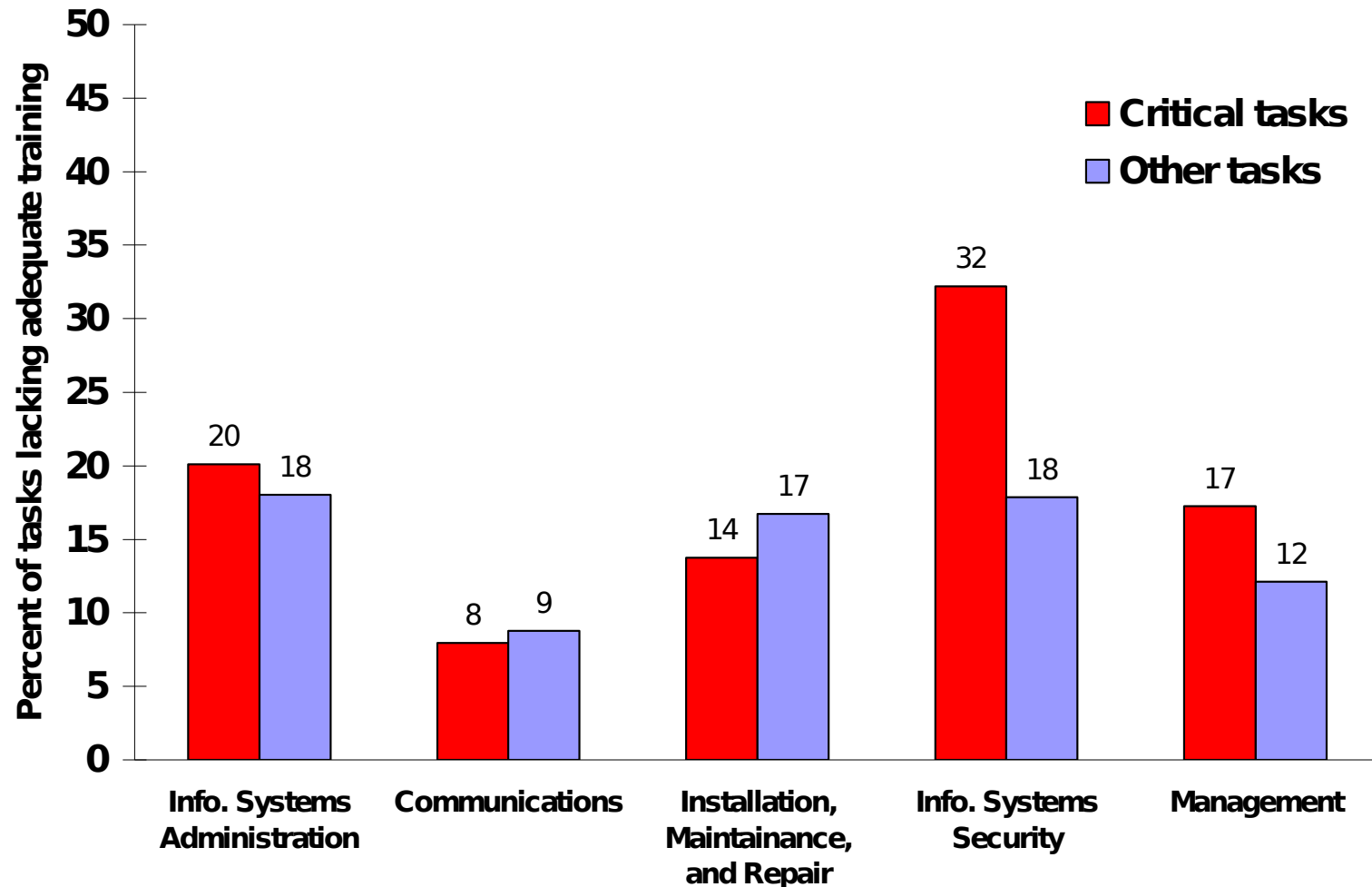
Reported by Sailors in survey

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Skill Groups with the Largest Training Gaps

Info. Systems Administration — **Web site maintenance*** : 38

Communications — **Frequency management** * : 16

Install., Maintenance, and Repair — **Network hardware installation** ** : 29

Info. Systems Security — **Analysis of suspicious network activity*** : 48

Management — **Computer network defense*** : 47

Percent of tasks lacking adequate training

(x-axis: 0, 10, 20, 30, 40, 50)

*   Not captured by Occupational Standards

** Captured partially

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Overview

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Critical Tasks Not Covered by Navy Schoolhouse and Community College

Information Systems Administration

Percent not covered

IT A-School

+

C-School (NEC 2735)

38

Tidewater Community College

10

22 weeks

52 weeks

Sept 2001 curriculum
Technical tasks only

21
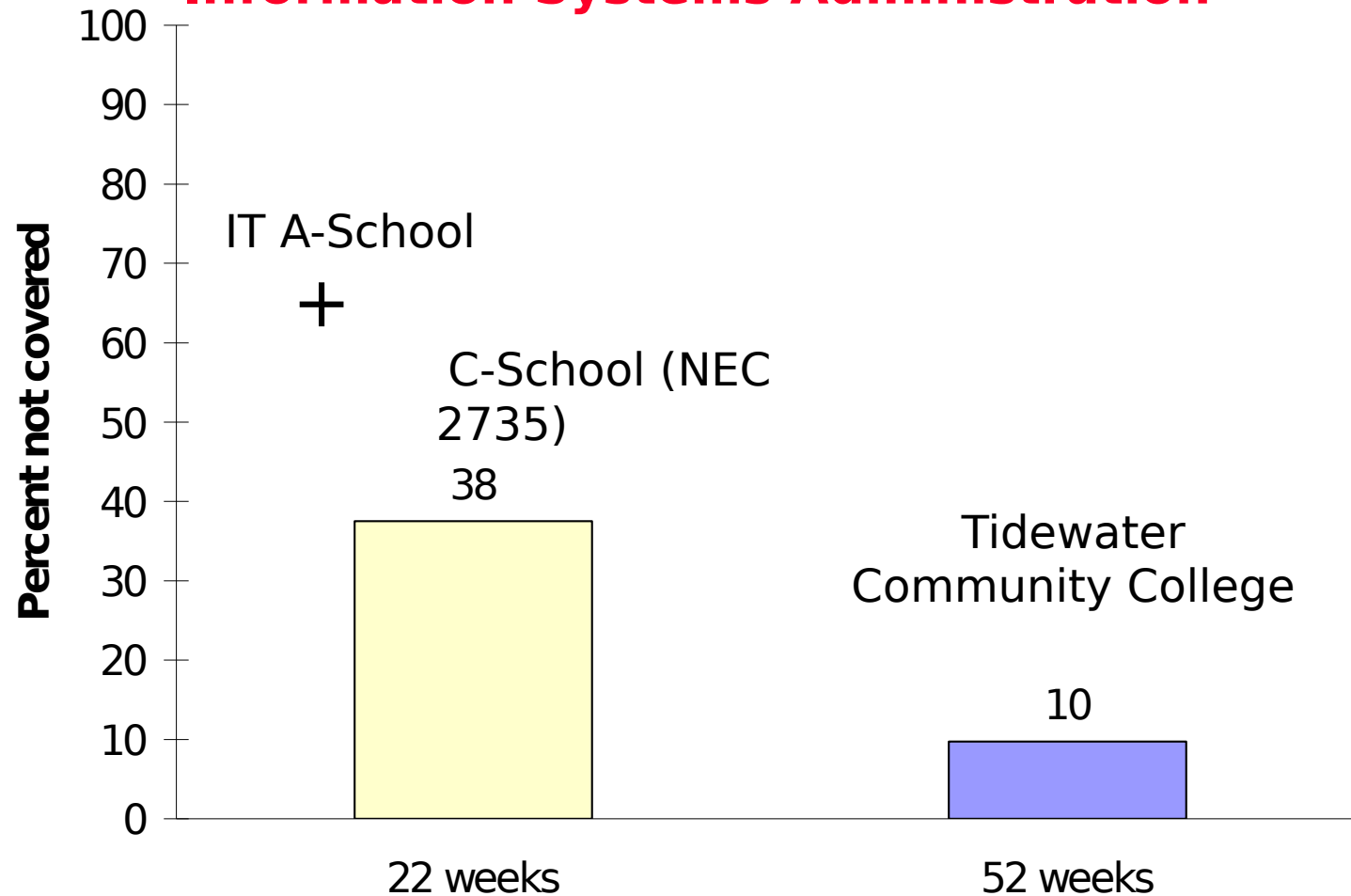
Model of Costs and Benefits of Enhancing IT Training

Three options

- **Option 1—Outsource to 1-year college program**
  - **Tidewater Community College experience**
- **Option 2—Redesign A- and C-School**
  - **Use Skill Groups to cover mission critical tasks**
- **Option 3—Redesign and outsource A- and C-School**
  - **Option 2 run by college**

How we measured benefits

- **Included lost productivity of personnel (such as in OJT)**
- **Included retention increase from college oppty. (options 1, 3)**
- **Excluded overhead in schoolhouse costs (such as security of facilities)**

Impact of Enhancing IT Training
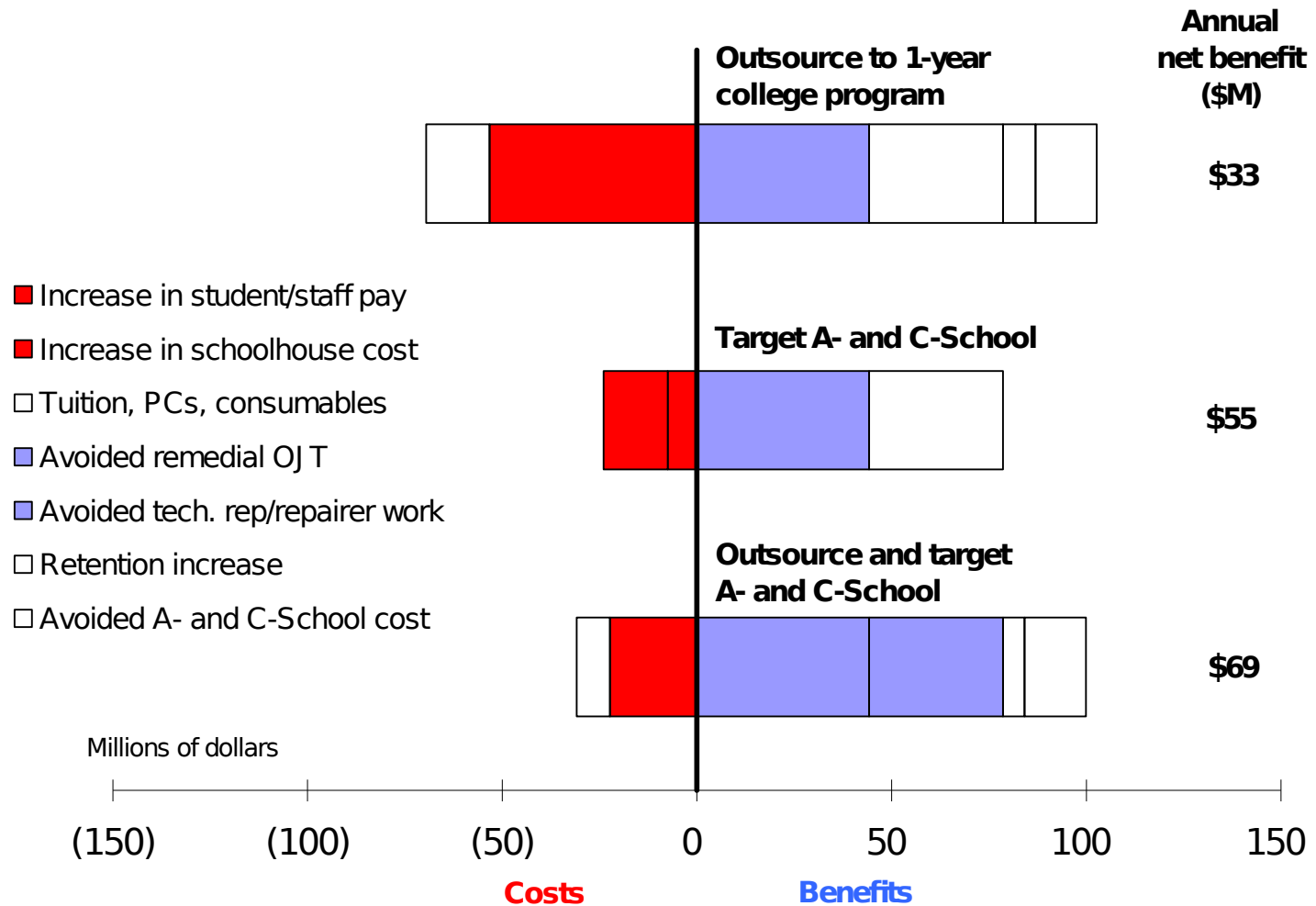
Combined IT A-School and NEC 2735 instruction

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Summary

□ **IT schoolhouses do not cover many critical tasks**

□ **Most Sailors find OJT and self-study—not A- or C-School—the most useful**

□ **Outsourcing IT A- and C-Schools and redesigning them with Skill Groups would be cost effective**

  – **Annual net benefit of $69M**

  – **Outsourcing to a one-year program or redesigning training only also cost-effective, but smaller payoff**

□ **Significant overlap in IT tasks of ITs, CTO/CTMs, and FTs**

  – **Potential for training consolidation**

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Summary
Continued

- **A majority of Information Systems Admin. Sailors not holding NEC 2735 do NEC 2735 work**

- **Skill Groups are more comprehensive than the Occupational Standards**

- **Reenlistment bonuses are often paid out of field**

- **Advancement exams do not cover many critical tasks**

Recommendations

- **Enhance Occupational Standards with Skill Groups**
- **Outsource IT training and target it with Skill Groups**
- **Integrate NEC 2735 into the A-School pipeline**
- **Consolidate IT, CTO/CTM, and FT training for overlapping tasks**
- **Redesign IT workforce advancement exams to cover more critical tasks**
- **Conduct IT pilot project**
  - **Assign personnel based on critical Skill Group proficiency**
  - **Pay bonuses for performance of critical Skill Groups**

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Longer-Term Navy-wide Applications

CNA

Recruiting
- Screen for the right KSATs
- Assess potential for lateral entry

Readiness
- Identify mission-critical tasks

Training
- Define requirements
- Identify gaps
- Identify courses to combine

Career structure
- Absorb many NECs into jobs

Skill Group Database

Assignment
- Assign personnel based on Skill Group proficiency

Manpower
- Enhance input to requirements determination

Retention
- Target bonuses to Skill Groups, not rating/NEC titles

Promotion
- Write tests that cover the critical tasks

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Backup slides

Career Path by Skill Group
Information Systems Administration

Master

Financial management   Operation monitoring
Organizational oversight

Personnel management   Training of other personnel   Communications
administration

Learning activities   Radio monitoring   Standard reports and
documents

Journeyman
Reporting   Network implementation planning   Scheduling

Troubleshooting strategy   Information gathering   Comp. equipment
maintenance

Training evaluation   Technical data maintenance   Technical coordination

Material resource manag.   Configur. and control-network   Customer service

Messaging

Apprentice

Fault analysis   Network analysis   Web site maintenance

System administration   Basic computer operations   Performance
standards

Mathematical calculations   Network monitoring   Configur. and control-
computer

Data Collection

	Participants					Output
	Cross section of sailors	**Top performing sailors**	**CNA/ SkillsNET**	**Sailors Navy-wide**	**CNET**	
Select tasks from previous JTA, generate new tasks	🟢					List of tasks
Edit task list		🔵	🔴			Final list of tasks
Link tasks to skills and abilities		🔵	🔴			Skills and abilities
Cluster tasks with similar skills		🔵				Task clusters
Identify tools and knowledge for each cluster		🔵	🔴			Tools and knowledge
Edit clusters		🔵	🔴			Final task clusters
Construct surveys			🔴			Online instrument
Collect survey data online				🟣		Criticality & frequency
Identify alignment of tasks and: • **Training curriculum** • **Advancement tests**			🔴		🟡	Training gaps and testing gaps
Analyze data			🔴			

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Defining the Jobs

Occupational Standards
Rating
IT--Info Systems Tech
CTO--Cryptologic Tech Oper.
FT--Fire Control Tech
CTM--Cryptologic Tech Maint.
ET--Electronics Tech

Skill Groups	
Job	**Main source ratings**
Info Sys Admin	IT, FT, CTO
Communications	IT, CTO
Install., Maint. & Repair	ET, CTM
Info System Security	IT, FT, CTO
Management	IT, FT, CTO, ET, CTM

Skill Group Components

Each group typically contains 2-25 tasks

| Task 1 | Task 2 | Task 3 | Task 4 | Task 5 |

Skill Group

Each job typically has 20-30 Skill Groups

| Knowledge (References) | Skills 46 | Abilities 52 | Tools |

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A-Schools Do Not Cover Many Critical Tools

Sept 2001 curriculum

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